Local Government Energy Audit:
Energy Audit Report

Building #29 - Arts & Science

101 Vera King Farris Drive

Galloway, NJ 08205

Stockton University

July 15, 2019

Final Report by:

TRC Energy Services

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC Energy Services (TRC) reviewed the energy conservation measures and estimates of energy savings were reviewed for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Building #29 - Arts & Science (Building #29).

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey universities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Building #29 is a 42,209 square foot facility comprised of various space types within a single building. The three-story building includes classrooms, offices, a greenhouse, lobbies, labs and mechanical and electrical spaces.

Interior lighting at Building #29 primarily consists of linear T8 fluorescent lamps as well as compact fluorescent, incandescent, halogen and some LED fixtures. Exterior lighting is mostly metal halide and LED fixtures as well as a couple fixtures with high pressure sodium lamps. Cooling is provided by several air conditioners and variable refrigerant flow split-system air-source heat pumps. Heating is provided by the same split system heat pumps as well as electric duct heaters and supplemented with some electric baseboard heaters. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven measures and recommends six measures which together represent an opportunity for Building #29 to reduce annual energy costs by $13,178 and annual greenhouse gas emissions by 110,493 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in four years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Building #29's annual energy use by 6%.

Figure 1 – Previous 12 Month Utility Costs

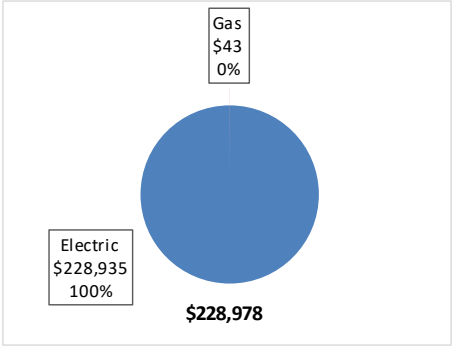
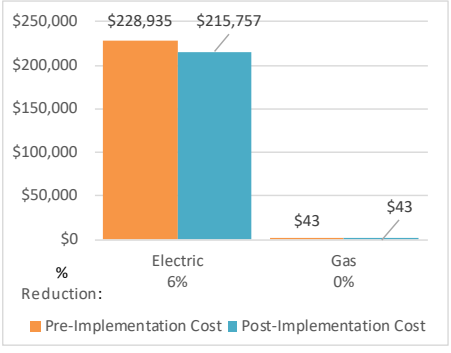


Figure 2 – Potential Post-Implementation Costs



A detailed description of Building #29's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			88,862	13.4	0.0	$10,672.33	$41,682.47	$7,130.00	$34,552.47	3.2	89,483
ECM 1	Install LED Fixtures	Yes	17,185	2.5	0.0	$2,063.91	$17,751.52	$1,150.00	$16,601.52	8.0	17,305
	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	13	0.0	0.0	$1.59	$64.77	$10.00	$54.77	34.5	13
ECM 2	Retrofit Fixtures with LED Lamps	Yes	68,773	10.6	0.0	$8,259.65	$21,476.47	$5,970.00	$15,506.47	1.9	69,254
ECM 3	Install LED Exit Signs	Yes	2,891	0.2	0.0	$347.19	$2,389.71	$0.00	$2,389.71	6.9	2,911
Lighting Control Measures			17,654	2.6	0.0	$2,120.20	$19,560.00	$1,680.00	$17,880.00	8.4	17,777
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	12,460	1.9	0.0	$1,496.43	$12,960.00	$1,680.00	$11,280.00	7.5	12,547
ECM 5	Install High/Low Lighitng Controls	Yes	5,194	0.8	0.0	$623.78	$6,600.00	$0.00	$6,600.00	10.6	5,230
Plug Load Equipment Control - Vending Machine			3,224	0.0	0.0	$387.16	$460.00	$0.00	$460.00	1.2	3,246
ECM 6	Vending Machine Control	Yes	3,224	0.0	0.0	$387.16	$460.00	$0.00	$460.00	1.2	3,246
TOTALS FOR HIGH PRIORITY MEASURES			109,726	16.0	0.0	$13,178.12	$61,637.70	$8,800.00	$52,837.70	4.0	110,493
TOTALS FOR ALL EVALUATED MEASURES			109,739	16.0	0.0	$13,179.70	$61,702.47	$8,810.00	$52,892.47	4.0	110,507

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlet when not in use.

Energy Efficient Practices

TRC also identified five low-cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Building #29 include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Proper Water Heater Maintenance
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Building #29. Based on the configuration of the site and its loads, there is a moderate potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	54	kW DC STC
Electric Generation	64,334	kWh/yr
Displaced Cost	$5,600	/yr
Installed Cost	$182,500	

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program, you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Charles (Skip) West , AIA	Director, Office of Facilities Planning & Construction	Charles.West@stockton.edu	(609) 626-5522
Designated Representative			
Michael J. Ferraro II	Energy Systems Specialist	Michael.Ferraro@stockton.edu	(609) 652-4884
TRC Energy Services			
Vish Nimbalkar, P.E.	Auditor	VNaikNimbalkar@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On May 30, 2018, TRC performed an energy audit at Building #29 located in Galloway, New Jersey. TRC's team met with Mike Ferraro, Energy Systems Specialist to review the facility operations and help focus our investigation on specific energy-using systems.

Building #29 is a 42,209 square foot facility comprised of various space types within a single building. The building is two floors plus mechanical room and attic and includes classrooms, offices, a greenhouse, lobbies, labs and mechanical and electrical spaces.

Interior lighting at Building #29 primarily consists of linear T8 fluorescent lamps as well as compact fluorescent, incandescent, halogen and some LED fixtures. Exterior lighting is mostly metal halide and LED fixtures as well as a couple fixtures with high pressure sodium lamps. Cooling is provided by several variable refrigerant flow split-system air-source heat pumps and air conditioners. Heating is provided by the split-system heat pumps as well as electric duct heaters and supplemented with some electric baseboard heaters.

The building was constructed in 1996.

2.3 Building Occupancy

The building is open every day. The typical schedule is presented in the table below. The entire facility is used year-round by the campus. During a typical day, the facility is occupied by 600 staff and students.

Figure 6 - Building Schedule

Building Occupancy Schedule		
Building Name	Weekday/Weekend	Operating Schedule
Building 29 - Arts & Science	Weekday	8:00 AM to 10:00 PM
Building 29 - Arts & Science	Weekend	8:00 AM to 6:00 PM

2.4 Building Envelope

The building is constructed of brick masonry and structural steel. The building has a flat roof with an asphalt roof system and a portion of the roof is an arched architectural sheet steel roof. The building has double-pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum, some with large glass panes, and in good condition. Some areas of the building envelope appeared to be in poor shape and in need of replacement.

Figure 7 - Building Envelope

2.5 On-Site Generation

Stockton University installed a 1,200 kW DC solar energy project in March 2015. The project included photovoltaic (PV) arrays on parking lot canopies, one of which is interconnected near Building #29. The systems provide 6% of the electricity required by the campus.

Marina Energy is the power purchase agreement provider and financier of the solar energy system.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Interior lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some incandescent, halogen, LED and compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 4-lamp, 4-foot long troffers with diffusers.

Lighting control in most spaces is provided by manual wall switches.

The building's exterior lighting consists primarily of metal halide and LED fixtures and a couple high pressure sodium (HPS) fixtures.

Heating, Ventilation, and Air-Conditioning (HVAC)

Eight Trane split-system air conditioning (AC) units and 15 Trane variable refrigerant flow (VRF) split-system heat pumps are used to condition the building. AC units have nominal cooling capacities from about 1.5 tons to 11.5 tons each. Heat pumps have cooling capacities ranging from about 6 tons to 15.5 tons, and heating capacities ranging from 77 kBtu/hr. to 206 kBtu/hr. All units are located on the roof.

The facility has about 45 indoor air diffusers associated with the VRF systems, all with small fractional horsepower fan motors. The split-system AC units each have a small indoor air handler associated with them. Supply fans for the air handlers range from 0.5 hp to 3 hp.

The units are controlled by individual thermostats located in zones.

Figure 8 – HVAC Equipment

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of an AO Smith electric hot water heater with an input rating of 36 kW. The water heater has a 119 gallon storage tank. A 0.75 hp recirculation pump distributes water via a circulation loop to the entire site. The circulation pump operates continuously.

Figure 9 – Domestic Hot Water Equipment

Building Plug Load

There are 147 computer work stations throughout the facility. There are also a number of other plug load appliances including printers, projectors, microwaves, refrigerators, coffee makers and televisions. Due to the nature of the facility, there are also various laboratory process plug loads.

The facility also has two refrigerated vending machines.

Figure 10 – Plug Load Appliances

2.7 Water-Using Systems

There are about ten lavatory faucets at this facility. A sampling found that all of the faucets are rated for 1 gallons per minute (gpm) or higher.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

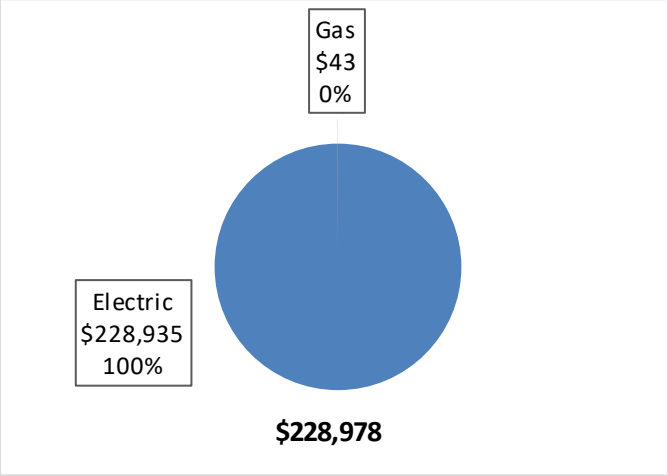
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 11 - Utility Summary

Utility Summary for Building 29 - Arts & Science		
Fuel	Usage	Cost
Electricity	1,906,200 kWh	$228,935
Natural Gas	43 Therms	$43
Total		$228,978

The current annual energy cost for this facility is $228,978 as shown in the chart below.

Figure 12 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.120/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. Electric demand and consumption does not vary significantly throughout the year due to the heating and cooling loads provided by electric equipment. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 13 - Electric Usage & Demand

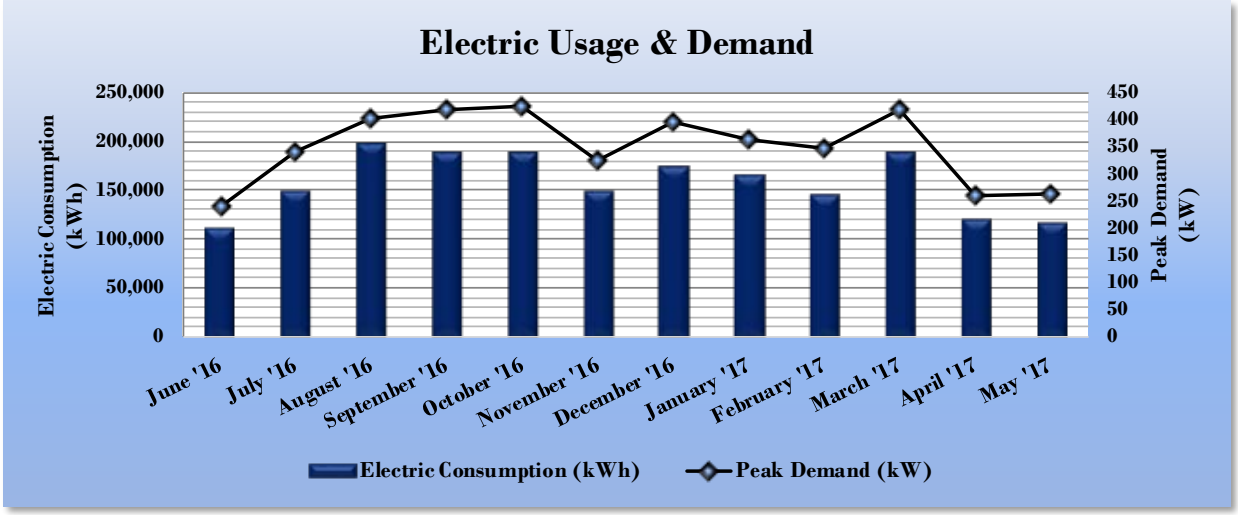


Figure 14 - Electric Usage & Demand

Electric Billing Data for Building 29 - Arts & Science						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
6/30/16	30	112,600	240		$13,523	Yes
7/31/16	31	150,200	340		$18,039	Yes
8/31/16	31	198,000	403		$23,780	Yes
9/30/16	30	189,800	419		$22,795	Yes
10/31/16	31	189,800	425		$22,795	Yes
11/30/16	30	149,800	323		$17,991	Yes
12/31/16	31	175,400	395		$21,066	Yes
1/31/17	31	166,400	362		$19,985	Yes
2/28/17	28	147,000	346		$17,655	Yes
3/31/17	31	189,600	419		$22,771	Yes
4/30/17	30	120,200	261		$14,436	Yes
5/31/17	31	117,400	262		$14,100	Yes
Totals	365	1,906,200	425	$0	$228,935	12
Annual	365	1,906,200	425	$0	$228,935	

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.011/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The minimal gas use is from the natural gas backup generator, primarily from an annual test which occurred in September.

Figure 15 - Natural Gas Usage

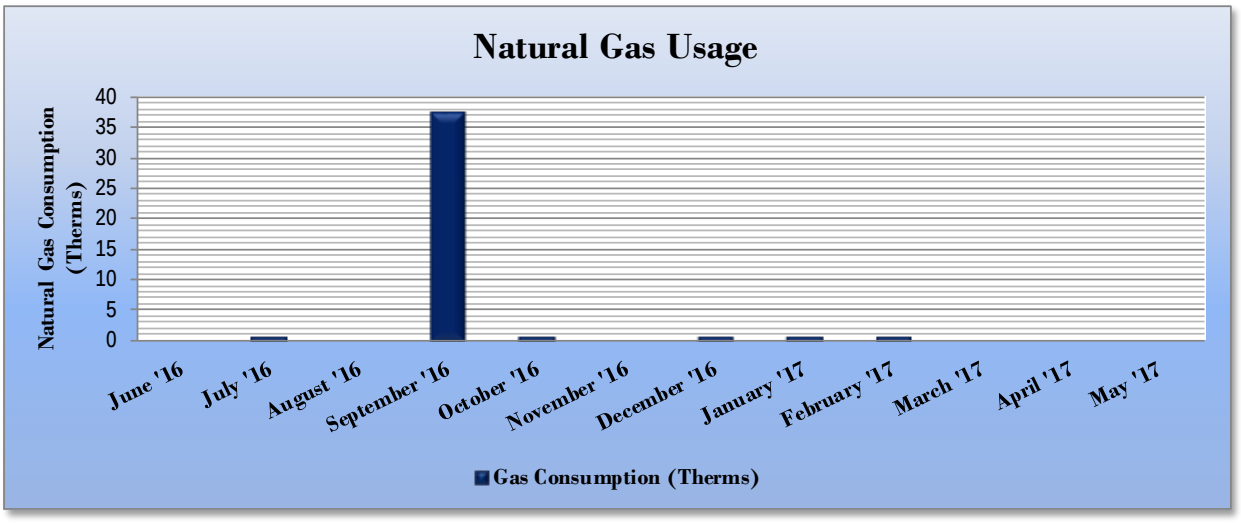


Figure 16 - Natural Gas Usage

Gas Billing Data for Building 29 - Arts & Science				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/30/16	30	0	$0	Yes
7/31/16	31	1	$1	Yes
8/31/16	31	0	$0	Yes
9/30/16	30	38	$38	Yes
10/31/16	31	1	$1	Yes
11/30/16	30	0	$0	Yes
12/31/16	31	1	$1	Yes
1/31/17	31	1	$1	Yes
2/28/17	28	1	$1	Yes
3/31/17	31	0	$0	Yes
4/30/17	30	0	$0	Yes
5/31/17	31	0	$0	Yes
Totals	365	43	$43	12
Annual	365	43	$43	

3.4 Benchmarking

This facility was benchmarked using *Portfolio Manager®*, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 17 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Building 29 - Arts & Science	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	483.9	262.6
Site Energy Use Intensity (kBtu/ft^2)	154.2	130.7

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the Table below:

Figure 18 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Building 29 - Arts & Science	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	456.1	262.6
Site Energy Use Intensity (kBtu/ft^2)	145.3	130.7

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This building is currently not eligible to receive a score.

A Portfolio Manager® Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

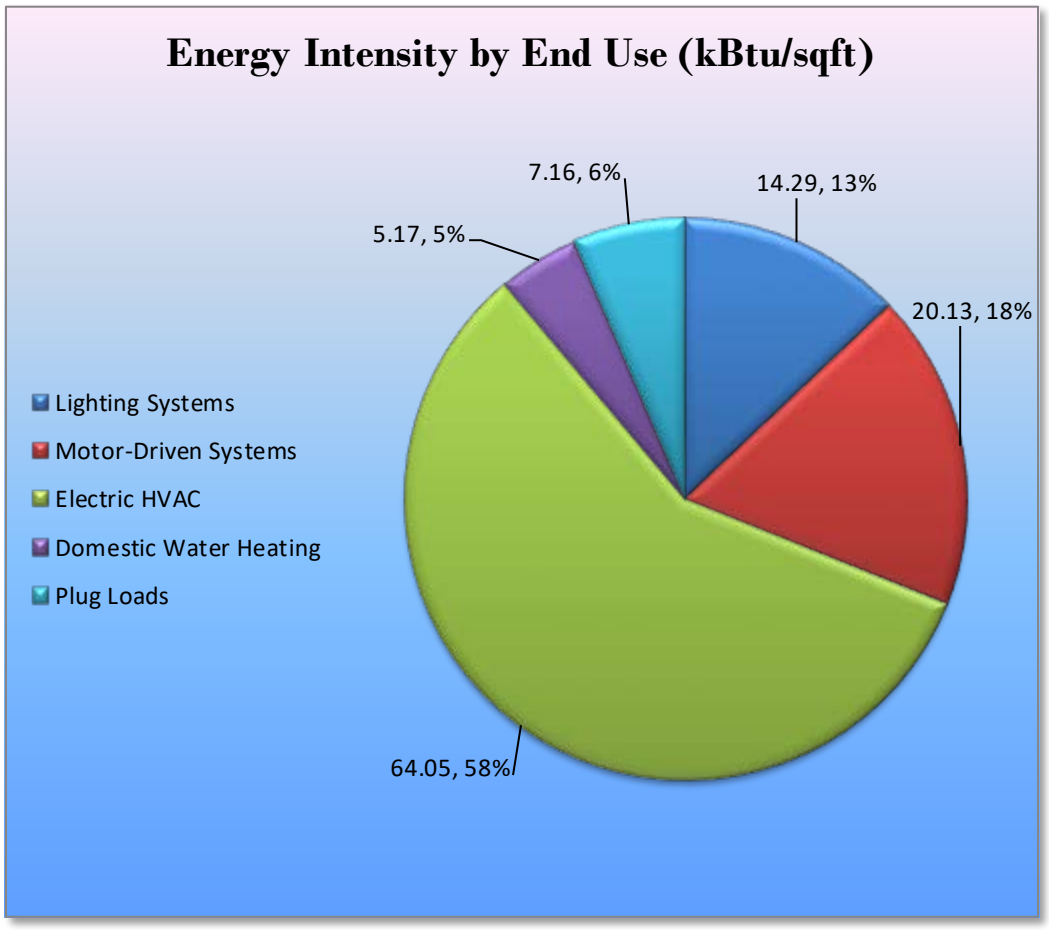
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager® account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 19 - Energy Balance (kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Building #29 regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 20 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		88,849	13.3	0.0	$10,670.75	$41,617.70	$7,120.00	$34,497.70	3.2	89,470
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* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 21 below.

Figure 21 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		88,849	13.3	0.0	$10,670.75	$41,617.70	$7,120.00	$34,497.70	3.2	89,470
ECM 1	Install LED Fixtures	17,185	2.5	0.0	$2,063.91	$17,751.52	$1,150.00	$16,601.52	8.0	17,305
ECM 2	Retrofit Fixtures with LED Lamps	68,773	10.6	0.0	$8,259.65	$21,476.47	$5,970.00	$15,506.47	1.9	69,254
ECM 3	Install LED Exit Signs	2,891	0.2	0.0	$347.19	$2,389.71	$0.00	$2,389.71	6.9	2,911

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	17,185	2.5	0.0	$2,063.91	$17,751.52	$1,150.00	$16,601.52	8.0	17,305

Measure Description

We recommend replacing exterior wall packs, pole fixtures in the parking areas, and bollards containing metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of other sources.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	68,773	10.6	0.0	$8,259.65	$21,476.47	$5,970.00	$15,506.47	1.9	69,254
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting interior linear fluorescent, incandescent, halogen, and CFL lighting technologies in classrooms, offices, labs, hallways, stairwells, and restrooms with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent sources and more than ten times longer than many incandescent lamps.

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	2,891	0.2	0.0	$347.19	$2,389.71	$0.00	$2,389.71	6.9	2,911
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all incandescent or compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting controls are summarized in Figure 22 below.

Figure 22 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		17,654	2.6	0.0	$2,120.20	$19,560.00	$1,680.00	$17,880.00	8.4	17,777
ECM 4	Install Occupancy Sensor Lighting Controls	12,460	1.9	0.0	$1,496.43	$12,960.00	$1,680.00	$11,280.00	7.5	12,547
ECM 5	Install High/Low Lighitng Controls	5,194	0.8	0.0	$623.78	$6,600.00	$0.00	$6,600.00	10.6	5,230

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
12,460	1.9	0.0	$1,496.43	$12,960.00	$1,680.00	$11,280.00	7.5	12,547

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, classrooms, offices areas, and the green house for lighting not associated with plant growth. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,194	0.8	0.0	$623.78	$6,600.00	$0.00	$6,600.00	10.6	5,230

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Recommended areas for such lighting control are interior corridors and lobbies.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches.

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Plug Load Equipment Control - Vending Machines

Our recommendation for upgrades to vending machine controls is summarized in Figure 23 below.

Figure 23 – Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		3,224	0.0	0.0	$387.16	$460.00	$0.00	$460.00	1.2	3,246
ECM 6	Vending Machine Control	3,224	0.0	0.0	$387.16	$460.00	$0.00	$460.00	1.2	3,246

ECM 6: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,224	0.0	0.0	$387.16	$460.00	$0.00	$460.00	1.2	3,246

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 24 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades	13	0.0	0.0	$1.59	$64.77	$10.00	$54.77	34.5	13
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13	0.0	0.0	$1.59	$64.77	$10.00	$54.77	34.5	13
TOTALS	13	0.0	0.0	$1.59	$64.77	$10.00	$54.77	34.5	13

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	13	0.0	0.0	$1.59	$64.77	$10.00	$54.77	34.5	13
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We evaluated retrofitting existing fluorescent fixtures in the mechanical room by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes.

Reasons for not Recommending

The payback period of the measure is significantly greater than the effective useful life of the replacement equipment.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20–60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6–12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before deciding to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

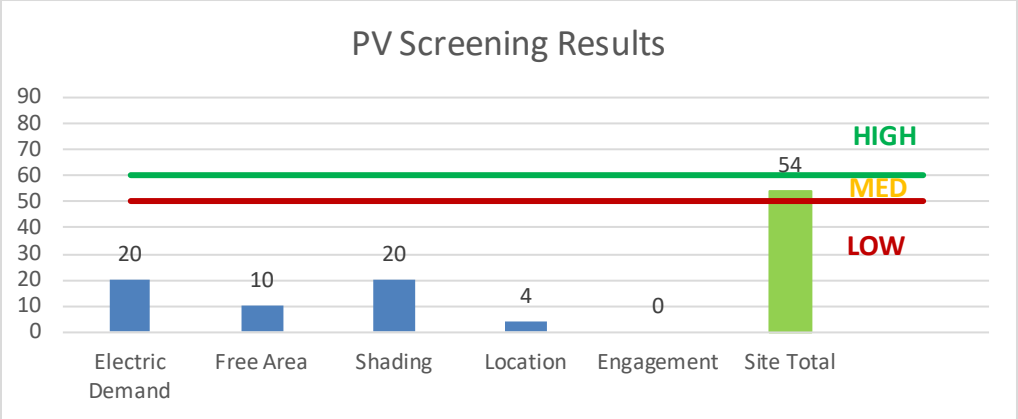
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a **Medium** potential for installing a PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the potential for additional PV at this building. A PV array located over the main parking lot may be feasible. If Building #29 is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 25 - Photovoltaic Screening



Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.6 for additional information.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

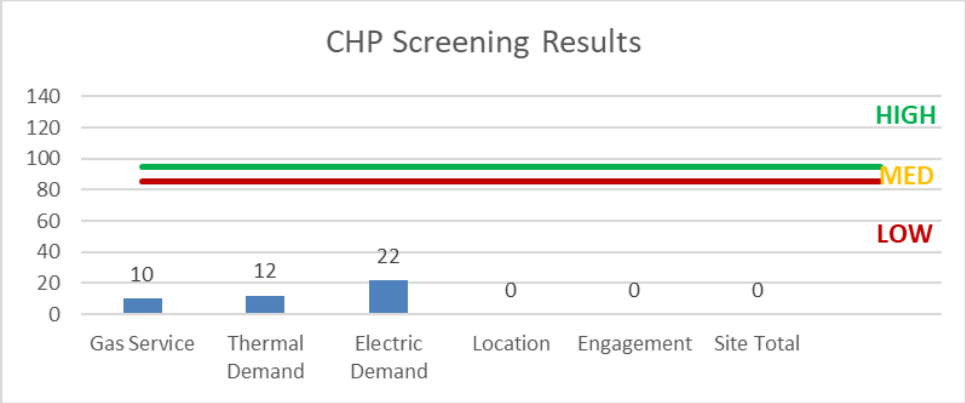
Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a **Low** potential for installing a cost-effective CHP system.

Low and infrequent thermal load and lack of space near the existing boilers are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

Figure 266 – Combined Heat & Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically, an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

All Stockton University buildings participate in electricity demand response since 2012. Curtailment service provider is awarded by bid. The Program meets or exceeds goal every year.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 25 for a list of the eligible programs identified for each recommended ECM.

Figure 277 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X					
ECM 2	Retrofit Fixtures with LED Lamps	X					
ECM 3	Install LED Exit Signs						
ECM 4	Install Occupancy Sensor Lighting Controls	X					
ECM 5	Install High/Low Lighitng Controls						
ECM 6	Vending Machine Control						

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to apply for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB.

8.2 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SRECs are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SRECs to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an Energy Services Company or "ESCO."
(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
(3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program description and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e., non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple of years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third party Supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple of years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mech room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.34	211	0.0	$25.37	$584.24	$160.00	16.73
Mech room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	400	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	400	0.01	7	0.0	$0.88	$32.52	$10.00	25.47
Mech room	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	400	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	400	0.02	15	0.0	$1.82	$64.77	$10.00	30.04
Mech room	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$24.20	$144.83	$0.00	5.99
Stairwell	7	Compact Fluorescent: Interior 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	7	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.04	270	0.0	$32.43	$241.15	$70.00	5.28
Stairwell	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,300	Relamp	No	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	0.07	475	0.0	$57.01	$195.09	$60.00	2.37
Stairwell	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$24.20	$144.83	$0.00	5.99
1st Floor Hall (sci)	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.43	2,887	0.0	$346.72	$1,111.21	$140.00	2.80
1st Floor Hall (sci)	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$36.30	$217.25	$0.00	5.99
Sprinkler Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.10	653	0.0	$78.39	$146.06	$40.00	1.35
electric Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.15	979	0.0	$117.59	$219.09	$60.00	1.35
Lab AS114	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.28	1,856	0.0	$222.89	$598.64	$125.00	2.12
Lab AS114	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,300	0.04	277	0.0	$33.26	$73.03	$20.00	1.59
Office AS122	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS110	14	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	14	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS120	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS119	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS109	8	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	8	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS118	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
AS108	16	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	16	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS107	9	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	9	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Closet AS106	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.02	15	0.0	$1.82	$36.52	$10.00	14.54
Closet AS105	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.02	15	0.0	$1.82	$36.52	$10.00	14.54
AS102	32	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	None	Yes	32	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,010	0.12	807	0.0	$96.92	$810.00	$105.00	7.27
AS102	10	Incandescent: One lamp Incan fixture	Wall Switch	100	4,300	Relamp	Yes	10	LED Screw-In Lamps: 1 lamp screw-in LED fixture	Occupancy Sensor	15	3,010	0.66	4,426	0.0	$531.54	$442.25	$85.00	0.67

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
AS102	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	None	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS102	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$24.20	$144.83	$0.00	5.99
1st Floor Lobby	11	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	Yes	11	LED Screw-In Lamps: 2 lamp screw-in LED fixture	High/Low Control	18	3,010	0.11	721	0.0	$86.63	$778.95	$110.00	7.72
Showcase	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.19	1,305	0.0	$156.79	$292.12	$80.00	1.35
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.09	619	0.0	$74.30	$309.55	$30.00	3.76
Hallway	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$12.10	$72.42	$0.00	5.99
Main Lobby	49	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	Yes	49	LED Screw-In Lamps: 2 lamp screw-in LED fixture	High/Low Control	18	3,010	0.48	3,213	0.0	$385.88	$3,488.05	$490.00	7.77
Main Lobby	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.09	619	0.0	$74.30	$309.55	$30.00	3.76
Main Lobby	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$24.20	$144.83	$0.00	5.99
Vestibule	2	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	52	4,300	Relamp	No	2	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	36	4,300	0.02	154	0.0	$18.53	$68.90	$20.00	2.64
AS129	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.02	163	0.0	$19.60	$36.52	$10.00	1.35
Hallway	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.68	4,537	0.0	$544.84	$1,603.33	$220.00	2.54
Hallway	5	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.04	504	0.0	$60.49	$362.08	$0.00	5.99
Mens Restroom	9	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	Yes	9	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Occupancy Sensor	18	3,010	0.09	590	0.0	$70.88	$580.05	$125.00	6.42
Mens Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
Womens Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
Womens Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.11	726	0.0	$87.18	$416.06	$75.00	3.91
Womens Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,300	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	0.01	79	0.0	$9.50	$32.52	$10.00	2.37
Office AS135	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
Vending Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
Vending Area	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$12.10	$72.42	$0.00	5.99
CR AS139	12	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	12	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR AS139	6	Compact Fluorescent: 1 lamp CFL fixture	Wall Switch	13	4,300	Relamp	No	6	LED Screw-In Lamps: 1 lamp screw-in LED fixture	Wall Switch	9	4,300	0.02	116	0.0	$13.90	$103.35	$30.00	5.28
CR AS139	10	Compact Fluorescent: 3 lamp CFL fixture	Wall Switch	39	4,300	Relamp	Yes	10	LED Screw-In Lamps: 3 lamp screw-in LED fixture	Occupancy Sensor	27	3,010	0.15	984	0.0	$118.13	$786.75	$185.00	5.09
Mech room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	400	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	400	0.04	26	0.0	$3.09	$73.03	$20.00	17.14

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR AS126	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS125	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
CR AS140	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.65	4,356	0.0	$523.10	$1,146.36	$275.00	1.67
CR AS140	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
AS123,AS124	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
CR AS141	6	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	4,300	Relamp	Yes	6	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	3,010	0.51	3,415	0.0	$410.14	$927.27	$215.00	1.74
CR AS141	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$24.20	$144.83	$0.00	5.99
CR AS142	9	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	4,300	Relamp	Yes	9	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	3,010	0.76	5,123	0.0	$615.22	$1,255.91	$305.00	1.55
Stairwell	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,300	Relamp	No	7	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,300	0.08	554	0.0	$66.52	$227.61	$70.00	2.37
Stairwell	1	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	1	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.01	39	0.0	$4.63	$34.45	$10.00	5.28
Stairwell	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$36.30	$217.25	$0.00	5.99
AS213	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.05	326	0.0	$39.20	$73.03	$20.00	1.35
AS213	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.18	1,237	0.0	$148.59	$489.09	$95.00	2.65
AS212	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.05	326	0.0	$39.20	$73.03	$20.00	1.35
AS216	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.05	326	0.0	$39.20	$73.03	$20.00	1.35
Green house	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.37	2,474	0.0	$297.18	$708.18	$155.00	1.86
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.40	2,681	0.0	$321.95	$1,074.70	$130.00	2.93
Hallway	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$36.30	$217.25	$0.00	5.99
AS223	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS211	9	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	9	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS222	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS221	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS210	16	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	16	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS220	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
AS219	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
AS209 Lab	24	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	Yes	24	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	3,010	0.05	303	0.0	$36.35	$540.00	$70.00	12.93
AS207	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
Mens Restroom	6	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	6	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.03	231	0.0	$27.79	$206.70	$60.00	5.28
Mens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,300	0.04	277	0.0	$33.26	$73.03	$20.00	1.59
Womens Restroom	6	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	6	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.03	231	0.0	$27.79	$206.70	$60.00	5.28
Womens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,300	0.04	277	0.0	$33.26	$73.03	$20.00	1.59
AS203	18	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	18	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Floor Hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.55	3,712	0.0	$445.78	$1,257.27	$180.00	2.42
2nd Floor Hallway	4	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	403	0.0	$48.40	$289.66	$0.00	5.99
2nd Floor Hallway	13	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	Yes	13	LED Screw-In Lamps: 2 lamp screw-in LED fixture	High/Low Control	18	3,010	0.13	852	0.0	$102.38	$1,047.85	$130.00	8.97
2nd Floor Hallway	4	Compact Fluorescent: 4 lamp CFL fixture	Wall Switch	52	4,300	Relamp	Yes	4	LED Screw-In Lamps: 4 lamp screw-in LED fixture	High/Low Control	36	3,010	0.08	525	0.0	$63.00	$475.60	$80.00	6.28
AS202	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.55	3,712	0.0	$445.78	$1,197.27	$250.00	2.12
AS202	12	Incandescent: 1 lamp Incan fixture	Wall Switch	60	4,300	Relamp	Yes	12	LED Screw-In Lamps: 1 lamp screw-in LED fixture	Occupancy Sensor	9	3,010	0.47	3,187	0.0	$382.71	$476.70	$95.00	1.00
AS202	4	Compact Fluorescent: 1 lamp CFL fixture	Wall Switch	13	4,300	Relamp	No	4	LED Screw-In Lamps: 1 lamp screw-in LED fixture	Wall Switch	9	4,300	0.01	77	0.0	$9.26	$68.90	$20.00	5.28
AS230,231	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.05	326	0.0	$39.20	$73.03	$20.00	1.35
Janitor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.02	163	0.0	$19.60	$36.52	$10.00	1.35
AS234	18	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	None	No	18	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
AS234	2	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	2	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.01	77	0.0	$9.26	$68.90	$20.00	5.28
AS238	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.65	4,356	0.0	$523.10	$1,146.36	$275.00	1.67
Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,010	0.46	3,093	0.0	$371.48	$1,147.73	$150.00	2.69
Hallway	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$36.30	$217.25	$0.00	5.99
Office AS237	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
Office AS236	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
Office AS226	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
Office AS239	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.65	4,356	0.0	$523.10	$1,146.36	$275.00	1.67

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office AS239	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.12	825	0.0	$99.06	$416.06	$75.00	3.44
AS240	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.32	2,178	0.0	$261.55	$708.18	$155.00	2.11
AS240	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,300	0.05	326	0.0	$39.20	$73.03	$20.00	1.35
AS225,224	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
CR AS241	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,300	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,010	0.59	3,993	0.0	$479.51	$1,073.33	$255.00	1.71
CR AS241	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,300	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,010	0.09	619	0.0	$74.30	$379.55	$65.00	4.23
CR AS241	16	Halogen Incandescent: 1 lamp Halogen fixture	Wall Switch	40	4,300	Relamp	Yes	16	LED Screw-In Lamps: 1 lamp screw-in LED fixture	Occupancy Sensor	6	3,010	0.42	2,832	0.0	$340.18	$878.88	$150.00	2.14
Stairwell	5	Compact Fluorescent: 2 lamp CFL fixture	Wall Switch	26	4,300	Relamp	No	5	LED Screw-In Lamps: 2 lamp screw-in LED fixture	Wall Switch	18	4,300	0.03	193	0.0	$23.16	$172.25	$50.00	5.28
Exterior	15	Metal Halide: (1) 250W Lamp	None	295	4,380	Fixture Replacement	No	15	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	None	89	4,380	2.28	15,602	0.0	$1,873.81	$13,958.46	$750.00	7.05
Exterior	8	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	90	4,380	None	No	8	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	90	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	2	Metal Halide: (1) 250W Lamp	None	295	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	89	4,380	0.30	2,080	0.0	$249.84	$1,931.93	$200.00	6.93
Exterior	9	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	90	4,380	None	No	9	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	90	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	2	High-Pressure Sodium: (1) 250W Lamp	None	295	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	89	4,380	0.30	2,080	0.0	$249.84	$1,861.13	$200.00	6.65

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Multiple	Condesate pump for each ACU	53	Process Pump	0.5	76.2%	No	4,004	No	76.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVD0024 Units	7	Supply Fan	0.2	56.4%	No	4,004	No	56.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVD0027 Units	3	Supply Fan	0.3	68.5%	No	4,368	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVD0036 Units	5	Supply Fan	0.2	62.1%	No	4,368	No	62.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVA0048 Units	7	Supply Fan	0.3	50.7%	No	4,368	No	50.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVM0060 Units	11	Supply Fan	0.8	81.8%	No	4,368	No	81.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVA0076 Units	10	Supply Fan	0.5	75.5%	No	4,368	No	75.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TVA0096 Units	2	Supply Fan	0.5	50.6%	No	4,368	No	50.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TTR4 Units	4	Supply Fan	1.0	85.5%	No	4,368	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	4TTR4 Units	3	Supply Fan	0.5	76.2%	No	4,368	No	76.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	TTA150 Unit	1	Supply Fan	3.0	89.5%	No	4,368	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air compressor	2	Air Compressor	5.0	85.5%	No	4,957	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	DHW	1	Water Supply Pump	0.8	81.8%	No	8,760	No	81.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 213	1	Supply Fan	0.5	85.5%	No	4,368	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Mech Room	1	Exhaust Fan	0.1	68.5%	No	4,368	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Elec Room	1	Exhaust Fan	0.2	68.5%	No	4,368	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Elec Room	1	Exhaust Fan	0.3	68.5%	No	4,368	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 214, 209, restroom	3	Exhaust Fan	0.2	68.5%	No	4,368	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 210, restroom	2	Exhaust Fan	0.3	72.4%	No	4,368	No	72.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Various rooms	11	Exhaust Fan	0.5	76.2%	No	4,368	No	76.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Room 140, 215	2	Exhaust Fan	0.8	81.8%	No	4,368	No	81.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 110, 140	2	Exhaust Fan	1.0	85.5%	No	4,368	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 116A	1	Exhaust Fan	2.0	86.5%	No	4,368	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Entire Building	4	Split-System Air-Source HP	5.75	77.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	1	Split-System Air-Source HP	11.50	154.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	1	Split-System Air-Source HP	9.50	129.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	5	Split-System Air-Source HP	15.33	206.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	4	Split-System Air-Source HP	13.33	180.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	1	Split-System AC	1.46		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	4	Split-System AC	4.58		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	1	Split-System AC	11.46		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Entire Building	2	Split-System AC	2.85		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	2	Electric Resistance Heat		10.23	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		30.69	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		34.10	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		51.15	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		54.56	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	3	Electric Resistance Heat		68.20	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		85.25	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		88.66	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	3	Electric Resistance Heat		92.07	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACU duct heating	1	Electric Resistance Heat		117.32	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom/Office	Baseboard Heaters	1	Electric Resistance Heat		3.41	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom/Office	Baseboard Heaters	1	Electric Resistance Heat		4.26	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom/Office	Baseboard Heaters	1	Electric Resistance Heat		6.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom/Office	Baseboard Heaters	1	Electric Resistance Heat		7.68	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom/Office	Baseboard Heaters	1	Electric Resistance Heat		17.05	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Entire Facility	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Multiple	147	Computers	75.0	
Multiple	10	Printer (S)	20.0	
Multiple	10	Printer (M)	300.0	
Multiple	2	Printer (L)	515.0	
Multiple	6	Microwave	1,000.0	
Multiple	13	Overhead Projector	200.0	
Multiple	2	Minifridge	30.0	
Multiple	3	Refridgerator	600.0	
Breakroom	1	Coffeemaker	400.0	
Breakroom	1	TV	120.0	
Multiple	1	Misc. Process Loads	12,663.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Multiple	2	Refrigerated	Yes	0.00	3,224	0.0	$387.16	$460.00	$0.00	1.19

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

Stockton University - Bldg 29: Arts & Science

Primary Property Type: College/University
Gross Floor Area (ft²): 43,601
Built: 1992

For Year Ending: April 30, 2017
Date Generated: December 13, 2018

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Stockton University - Bldg 29: Arts & Science 101 Vera King Farris Drive Galloway, New Jersey 08205	Stockton University 101 Vera King Farris Drive Galloway, NJ 08205 (____)____-_____	Dan Cordle 101 Vera King Farris Drive Galloway, NJ 08205 609-652-4221 Dan.Cordle@stockton.edu

Property ID: 6623739

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
154.6 kBtu/ft²

Source EUI
432.7 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	6,735,971 (100%)
Natural Gas (kBtu)	4,278 (0%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	64.5
National Median Source EUI (kBtu/ft²)	180.6
% Diff from National Median Source EUI	140%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	683

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)